

NOTES ON PANAMANIAN TREES AND SHRUBS COLLECTED IN 1971 BY L. R. HOLDRIDGE AND OTHERS

JOHN D. DWYER¹

The following is a list of trees and shrubs collected by L. R. Holdridge, E. A. Lao, L. Maasola, and A. Gentry during the spring and summer of 1971 in the Republic of Panama. All the collections were made at approximately sealevel; the few collected at or above 100 meters will be noted in the list. No collection was made above 650 meters. Collections of the following families seem especially important: Humariaceae, Lauraceae, Myristicaceae, and Sapotaceae. Some material was identified in the sterile state by Dr. Holdridge and possibly by his colleagues; the sterile collections are recognized in the list by the asterisk (*) placed before the collector's name. The author identified approximately one half of the collections which are in flower and fruit. The collections of the Burseraceae and Rutaceae were identified by Dr. Duncan Porter; the Boraginaceae were identified by Dr. Joan Nowicke. Dr. Thomas Croat gave valuable assistance in the critical identification of several species. Miss Mireya Correa A. of Panama University deserves a special note of thanks for forwarding some of the collections. Mr. Yow-Yuh Chen of the Department of Biology, St Louis University, prepared the figure of the *Sacoglottis* fruit.

Among the more than 180 collections in the list one encounters 47 localities in Panama. For the sake of convenience the localities have been segregated along provincial lines and listed below, with each locality being given a number. The number is placed in parentheses following the collector and his collection number.

BOCAS DEL TORO

1. Isla Colón; 2. La Gruta, Isla Colón; 3. El Chumical.

CANAL ZONE

4. Albrook; 5. Ancón; 6. Balboa; 7. Pipe Line Road; 8. Summit Garden.

COLÓN

9. Between Colón and Portobelo; 10. Buena Vista; 11. Entrada a Sabanitas; 12. Gatún; 13. María Chiquita; 14. Playa Langosta; 15. Portobelo; 16. Río Indio; 17. Río Piedras; 18. Río Santa Isabel; 19. Río Trapiche; 20. Road to Portobelo; 21. Salud; 22. Santa Rita; 23. Santa Rita Arriba; 24. Villa Alondra, road to Portobelo; 25. West of Canal Zone.

HERRERA

26. Menchacha, Ocú; 27. Llaño de Las Minas; 28. La Cabuya, Las Minas; 29. Cerro Colorado de Las Minas; 30. El Chumal; 31. Los Hatillos, Pesé; 32. Quebrada El Cammaron; 33. Divisa.

LOS SANTOS

34. El Ejido de Los Santos.

PANAMÁ

35. Arraíjan, Cerro Silvestre; 36. Calzada Larga; 37. Canitos de Chepo; 38. Capira; 39. Cerro Azul; 40. Chichebre, Chepo; 41. Chiltepe; 42. La Chorrera; 43. La Cresta; 44. Nuevo Guararé; 45. Panamá; 46. Río Indio; 47. Sajalices, Capira.

¹ St. Louis University and Missouri Botanical Garden, 2315 Tower Grove Avenue, St. Louis, Missouri 63110.

In citing the collections the following format has been used. The families are arranged alphabetically. In parentheses, following the name of the family, one finds the author, the part, the volume, pagination, and year of publication of the specific family as found in the *Flora of Panama*, published periodically in the ANNALS OF THE MISSOURI BOTANICAL GARDEN. Some families have not been treated in the ANNALS, e.g. Rubiaceae.

Following the binomial name and its author, the collectors are abbreviated as follows: G—Gentry; H—Holdridge; L—Lao; M—Maasola. The collection site of each collection is indicated by the number in parentheses following the collection number. The DBH of the tree or shrub is given in centimeters and the height in meters, as for example 8 cm × 6 m. Common names, supplied by collectors, are appended. The notes which accompany many of the species in the list are those of the author, unless otherwise indicated. Special stress is placed upon range extensions within the Republic of Panama. Families recently treated in the *Flora of Panama* may be considered reliable in determining geographical ranges of species in the Republic. All determinations made by the author were checked in the herbarium of the Missouri Botanical Garden. Dr. L. R. Holdridge also checked much of the material at the same institution.

It is appropriate to point out that many species of trees and shrubs from Panama are poorly represented in herbaria. The arboreal vegetation, and for that matter, all kinds of vegetation, along the Atlantic face of the Isthmus, is poorly known. This is especially true of the area extending from the Province of Bocas del Toro, especially its eastern part, to the western side of the Panama Canal and into the Province of Colón. More than a quarter of the collections cited in this paper are from Salud, Province of Colón, immediately adjacent to the western part of Gatun Lake in the Canal Zone. These collections serve to support the need for intensive collecting in Colón. Equally significant are the collections in the list, though fewer in number, made in Colón on the eastern side of the Canal. The Santa Rita area in Colón, which is currently attracting a large number of collectors, has yielded several new species and has proven important in extending the geographical ranges of many others. While our collectors did not extend their efforts to the Province of Darién, it is appropriate to point out that there are few collections from the mountains of Darién. This makes it difficult to trace the geographical distribution of montane species at the eastern end of the Republic and in neighboring Colombia. By the same token the few specimens available from the Atlantic side of the western end of the Isthmus present a problem in defining phytogeographical relationships between Costa Rica and Panama. The reader is referred to my remarks concerning areas poorly collected in Panama (Dwyer, 1964: 115).

ANNONACEAE (Fries—Part 4. Vol. 49: 491–525. 1962).

Annona glabra L.—L & H 234 (21), 10 cm × 8 cm. This species grows in southern Florida, tropical America, and West Africa. It is common in Panama.

A. spraguei Saff.—L & H 179 (25), 9 m. A strictly Panamanian species with wide distribution in the Republic.

Malmea depressa (Baill.) Fries—L 96 (1), 30 cm × 20 m, "Yaya." This species is not listed in Fries' recent treatment but was collected by Bristan (360 (MO)) near Río Ganglon, Darien. The species extends from Mexico to Panama.

Stelechocarpus burahol (Hook. f.) Thoms.—H 6518 (8), 20 cm × 6 m. This exotic species, native of Malaya, was identified by Dr. Croat. The flowers are cauliflorous.

Unoniopsis floribunda Diels—L 91 (1), 20 cm × 16 cm, "Yaya Amarilla."

U. panamensis Fries—L & H 161 (20), 4 cm × 7 m. This species heretofore has been known only in Panama from Cerro Campana, Province of Panamá.

U. pittieri Saff.—L & H 50 (16), 3 cm × 6 m. This species has been previously collected in the Canal Zone and in the Province of Colón. It has been reported from British Honduras, Honduras, and Panama.

Xylopiacanthia macrantha Tr. & P.—L & H 51 (16). The fruits only were collected. The aggregate fruits are as large as a tennis ball. Dr. Croat reports that he has collected fruits twice this size on Barro Colorado Island, Canal Zone; the follicles, on splitting become brick-red within.

ANACARDIACEAE (Blackwell & Dodson—Part 6. Vol. 54: 351–379. 1969).

Spondias mombin L.—L 62 (47),—18 cm × 10 m. A common tree in Panama.

APOCYNACEAE (Nowicke—Part 8. Vol. 57: 59–130. 1970).

Himatanthus sp.—L & H 188 (21), "Calacuchillo," collected at 100 m. This sterile specimen is probably *H. articulata* (Vahl) Woodson. It is known in Panama only from the Provinces of Darién and San Blas. Nowicke (p. 81) erroneously cites *Williams* 823 (NY), collected in Cana, Darién, as having been collected in the Province of Colón.

Malouetia tamaguarina (Aubl.) DC—L 159 (20), 6 cm × 5 m. This species has not been reported north of the Guianas. Holdridge identified this collection. I note, however, that the fruits are not elongate and linear but rather measure about 1½ cm in diameter. The leaves of the Lao collection, on the other hand, certainly suggest *M. tamaguarina*.

AQUIFOLIACEAE (Edwin—Part 6. Vol. 54: 381. 1967).

Ilex guianensis (Aubl.) Ktze—L & H 229 (21), 10 cm × 8 m. This species has heretofore been reported from Bocas del Toro, Chiriquí, and Panama, this being the initial collection from Colón.

ARALIACEAE

Dendropanax arboreus (L.) Dcne. & Planch.—L, H & G 15 (7), 15 cm × 10 m, collected at 350 m elevation. This species has been reported from practically all Provinces of Panama.

BOMBACACEAE (Robyns—Part 6. Vol. 51: 37–68. 1964).

Theobroma bernoullii Cuatr.—L & H 213 (21), 15 cm. The sole representative of this species is the type *Pittier* 4105 (US). It was also collected from the Province of Colón. The flowers are cauliflorous.

BORAGINACEAE (Nowicke—Part 9. Vol. 56: 33–69. 1969).

Cordia dentata Poir—L 45 (30), 30 cm × 10 m, "Cuguaró" and "Billulo." This is common on the Pacific slope, having been collected in the Provinces of Herrera, Los Santos, and Veraguas.

- C. panamensis* Riley—*H* 6444B (10), 30 cm × 10 m. A common species much in need of study for intraspecific variation. It ranges from El Salvador to Panama.
- C. porcata* Nowicke—*L*, *H* & *G* 7 (22), shrub or treelet, collected at 100 m. Nowicke reports *Dwyer* & *Lallathin* 8586 (MO) incorrectly as collected in the Province of Los Santos.

BURSERACEAE (Porter—Part 6. Vol. 57: 5–27. 1970).

- Protium costaricense* (Rose) Engl.—*L*, *H* & *G* 16 (7), 20 cm × 10 m. This species is known from seven collections in the Province of Panamá and one in the Canal Zone (Barro Colorado Island).
- P. glabrum* (Rose) Engl.—*L* & *H* 172 (21), 3 cm × 6 m. While there are four collections of this species from the Province of Colón, *Pittier* 3949, 4190, 4191 (all US), and *Tyson et al.* 450 (MO), the present collection from Salud represents the most westward collection of the taxon in Panama.
- P. tenuifolium* subsp. *sessiliflora* (Rox.) Porter—*L* 123 (37), 15 cm × 6 m. A well collected species, known from numerous collections in the Canal Zone, as well as from the Provinces of Chiriquí, Darién, and Panamá.

CELASTRACEAE

- Maytenus jamaicensis* Kr. & Urb.—*L* & *H* 23 (21), 25 cm × 10 m. This species, according to Dr. Croat, is present on Barro Colorado Island, Canal Zone. I suspect that it is common in the Provinces of Panamá and Colón. *Lao* & *Holdridge* 23 is in fruit and flower, a combination rarely observed on herbarium specimens. The collectors describe the fruit as orange.
- Zinowiewia costaricensis* Lundell—*L* & *H* 49 (36).—This species, known from Costa Rica and from a solitary collection in Panama, *Maxon* 5109 (F), from El Boquete, Province of Chiriquí, has its range extended considerably eastward in the Republic.

COCHLOSPERMACEAE (Robyns—Part 6. Vol. 54: 61–64. 1967).

- Cochlospermum williamsii* Macbride—* *L* & *H* 178 (10), 15 cm × 9 m. While the collection is sterile, Holdridge has identified it as to species. This taxon, originally described from Peru, was not reported from Panama in Robyns' recent treatment.

COMBRETACEAE (Exell—Part 7. Vol. 45: 143–164. 1958).

- Terminalia bucioides* Standley & Williams—*L* & *H* 15 (24), 25 cm × 15 m; *H* & *M* 6530 (13), 10 cm × 7 m. This species is not listed in the relatively recent treatment of the family in the *Flora of Panama*.
- T. edulis* Blanco—*H* 6521 (8), 20 cm × 6 m. An exotic tree growing in Summit Garden. It is native to the Philippines.

DILLENIACEAE (Hunter—Part 6. Vol. 52: 579–598. 1965).

- Saurauia laevigata* Tr. & Pl.—*H* & *M* 6528 (13), 25 cm × 8 m, collected at 150 m; *L* & *H* 182 (21), 10 cm × 7 m. This species is common in Panama.

ERYTHROXYLONACEAE

- Erythroxylum amplum* Benth.—*L* & *H* 226 (21), 8 cm × 6 m. I have seen three sheets of this species in the Herbarium of the Missouri Botanical Garden; all of these are from Barro Colorado Island, Canal Zone: *Shattuck* 1022 and *Croat* 8265, 12679.

EUPHORBIACEAE (Webster & Burch—Part 6. Vol. 54: 211–350. 1967).

Acalypha diversifolia Jacq.—H 6446 (19), 3 m. This shrub is common in Central America.

Croton sp.—L & H 224 (21), “Algodoncillo.” This may be a new species. This collection has 3-lobed leaves resembling in shape and size those of *Gossypium barbadense* L. I have been unable to match it with any of our identified Central American crotons. Among the undetermined crotons I discovered a recent collection (*Kirkbride & Duke 1665* (MO)) from nearby Cerro Trinidad, Province of Panama, with the same vernacular name, “Algodoncillo.” It compares favorably with the Lao and Holdridge collection. The field notes on the Kirkbride and Duke sheet are illuminating: “Tree without red latex, 20 m tall; bark whitish; wood malodorous, rank smelling; flowers scurfy, greenish; stamens greenish-yellow. Second growth and culled forest, SE slopes of Cerro Trinidad.”

C. billbergianus Muell.-Arg.—L 148 (30); L & H 170 (21), 6 cm × 5 m; L & H 202 (21), 8 m, “Vaguero.” A common species in Panama.

C. panamensis (Kl.) Muell.-Arg.—L 148 (30), 15 cm × 7 m, collected at 140 m, “Sangrillo.” A common species in Panama.

Mabea occidentalis Benth.—L, H & G 2 (22), 6 m, collected at 100 m. A common species, collected on several occasions by the author on Cerro Azul and Cerro Jefe, Province of Panamá. It is rather common around the Canal Zone and adjacent Provinces, although readily confused with *M. montana* Muell.-Arg., the latter with leaves only subacuminate at the apex. *Mabea occidentalis* also occurs in Costa Rica.

Margaritaria nobilis L. f.—L & H 236 (21), 15 cm × 8 m. This has been widely collected in Panama but heretofore has not been reported for the Province of Colón.

Pera arborea Mutis—L, H & G 12 (23), 15 cm × 10 m. Known from previous collections in the Canal Zone and the Provinces of Colón, Darién and Panamá. It also occurs in Colombia.

Phyllanthus acuminatus Vahl—H 6525 (13). A common species ranging from Mexico to Argentina.

Sapium caudatum Pittier—L 113 (44), 20 cm × 10 m, “Olivo.”

Tetrorchidium gorgonae Croizat subsp. *robledoanum* (Cuatr.) Webster—L & H 13 (23), 50 cm × 10 m; L & H 33 (39), 16 cm × 10 m, collected at 600 m. This species heretofore has been known only from Cerro Jefe, Province of Panamá, and west of Gatun Locks in the Canal Zone. The present collections were made only a few miles from Cerro Jefe.

FLACOURTIACEAE (Robyns—Part 6. Vol. 55: 145–169. 1968).

Casearia javitensis HBK—L & H 230 (21), 15 cm × 6 m. Common in Panama.

C. sylvestris Sw.—H 6458 (40), 10 cm × 7 m. Common in Panama. It ranges from Mexico to Panama.

Laetia thalmia L.—L & H 228 (21), 15 cm × 10 m, collected at 600 m elevation. It is common in the Canal Zone and in adjacent Provinces.

Ryania speciosa var. *panamensis* Monachino—H & M 6532 (13), 5 m, collected at 100 m. This species is known from the Provinces of Bocas del Toro,

Canal Zone, Colón, and San Blas. The Holdridge collection was made only a few miles from Santa Rita Ridge, Province of Colón, where Dressler and Correa (647 (MO)) recently collected material of this species.

Zuelania guidonia (Sw.) Britt. & Millsp.—H 6445 (19), 20 cm × 10 m. This species, with a wide range from southern Texas to Panama, has heretofore been reported from Panama only once, Pittier 2710 from “the hills between Rio Grande and Pedro Vidal, Canal Zone.” Dr. Croat has collected it several times on Barro Colorado Island, Canal Zone (Croat 4962, 4973, 7187, 8393 (all MO)). Other collections from Barro Colorado Island, deposited in the Missouri Botanical Garden are Woodworth & Vestal 719; Zetek 3343, 3463).

GUTTIFERAE

Calophyllum brasiliense Camb.—H & M 6534 (13), 75 cm × 30 m. This large tree was identified from dried leaves. The material matches well a fruiting collection of the author (Dwyer et al. 7301 (MO)) from the summit of Cerro Jefe, Province of Panamá, a well-known collecting spot, less than 20 miles from María Chiquita, the location of the Holdridge and Maasola collection. This species ranges from southern Mexico to Panama.

Marila verapazensis Donn. Sm.—L, H & G 17 (7). This species is known from several collections in Panama. Holdridge notes that “this species grew in La Selva, Costa Rica.” It ranges from British Honduras to Colombia.

Rheedia madruno (HBK) Tt. & Pl.—L & H 190 (21), 40 cm × 20 m, “Satro.” As this species has been collected on Barro Colorado Island (Croat 10840 (MO)), its collection in nearby Salud, Province of Colón, is not surprising.

HUMARIACEAE

Sacoglottis ovicarpa Cuatr.—L, H & G 5 (22), “Conocillo”; * L & H 193 (21), 19 cm × 18 m, collected at 120 meters elevation; L & H 195 (21), 60 cm × 25 m, “Corotu.” L. R. Holdridge identified the three collections and in deference to his field experience with *Sacoglottis* I am giving his identifications priority. As the discussion which follows indicates, however, I am prepared to challenge them.

Of the three collections listed here, the one designated by an asterisk is sterile, while the others are in fruit. All three collections were made on the Atlantic side of the Isthmus.

The fruits of Lao & Holdridge 195 are oblong, measuring 3–4 cm in length and 2.2–2.8 cm in width. One drupe measuring 4 cm in length, was sectioned transversely with a bandsaw. The surface (exocarp) is smooth and deep purple-red in color in the dry state. The exocarp and mesocarp are evident on the cut face, the mesocarp appearing as a thin line. In softening a slice of the fruit in aerosol and boiling in glycerine the mesocarp became even more evident. The exocarp is thin, measuring 0.1–0.2 cm in width; the ligneous endocarp is studded with resinous subrotund cysts which measure 1–4 (–6) mm in diameter. There is no separation of the resinous cysts into large and small groups. The septal lines are faint on the cut face.

The fruit of Lao, Holdridge & Gentry 5 is oblong, measuring 3 cm in

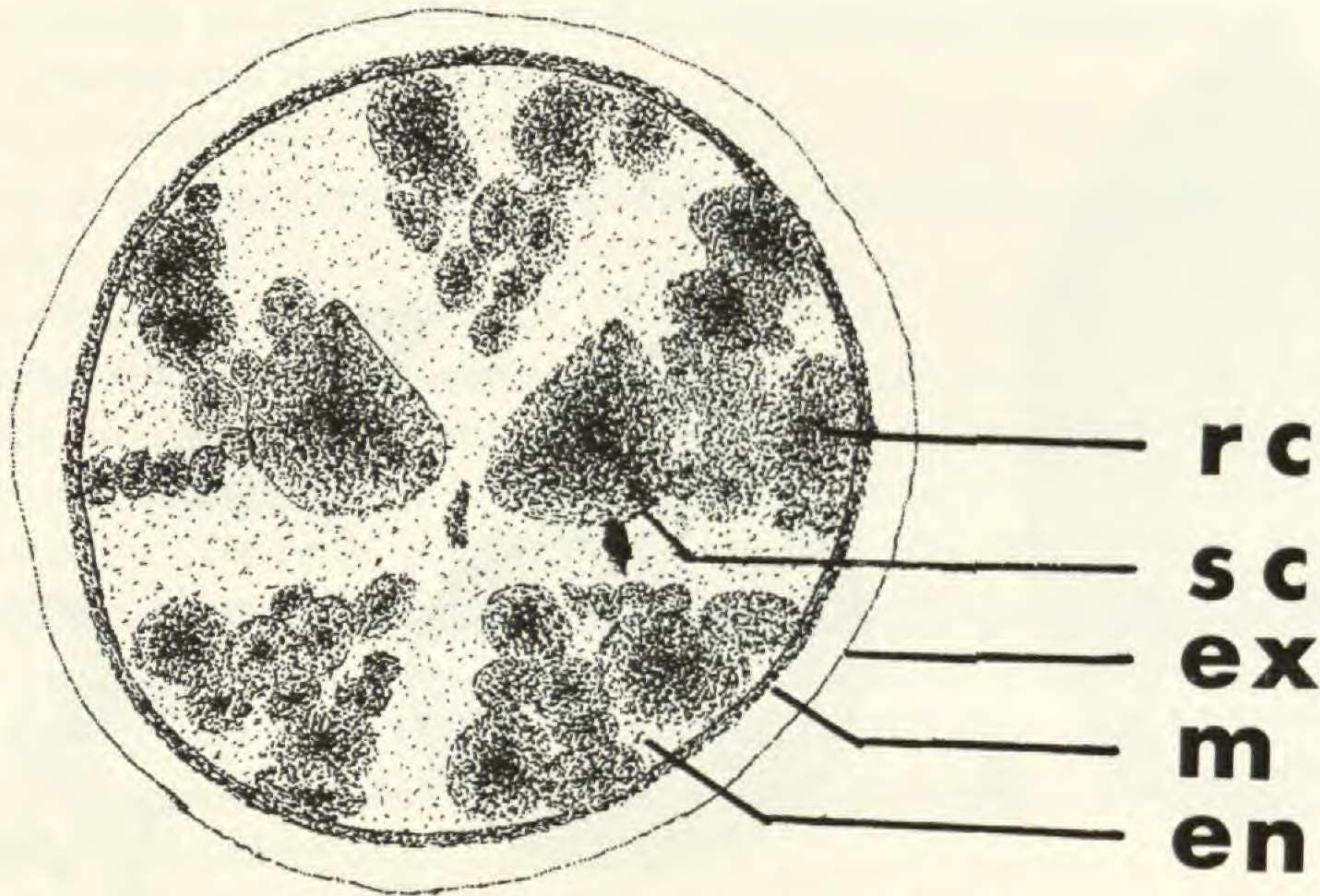


FIGURE 1. Cross section of fruit of *Sacoglottis* sp. (or *Schistostemon*) showing cut surface natural size. En—endocarp; ex—exocarp; m—mesocarp; rc—resinous cyst; sc—seminal cavity. Based on *Lao & Holdridge 195 (MO)*. $\times 2$.

length and 2 cm in width. The surface is rugose and pitted (resinous cysts), the exocarp presumably having rotted away. The superficial pits of the endocarp are more or less circular, measuring 1–1.5 mm in diameter (*cf.* Fig. 1).

On being cut transversely with a band-saw, the ligneous endocarp of *Lao, Holdridge & Gentry 5* exhibited great resistance. Most noticeable on the cut surface are 3 large seminal cavities, measuring ± 6 mm in diameter. The resinous cysts, scattered throughout the valves of the endocarp, are small, with a diameter measurement of 0.5–1.5 mm and averaging about 6 per valve. The cut faces of the valves appear cuneiform. On cutting the fruit, the 5 parts (which I regard as valves) of the endocarp easily separated themselves (or if they remained in position, could be pried loose with a fingernail) from 5 radially disposed septa of about equal length (*cf.* Fig. 2). These septa may contain occasional resinous cysts or canals. Each arm of the "star" measures about 0.2 cm in diameter on the cut surface. Viewed laterally, the septum extends almost the full length of the endocarp (Fig. 1). The remnants of the disintegrated seeds are evident.

From a study of the illustrated fruits in Cuatrecasas (1961) revision of the Humariaceae, especially Fig. 31, n–p I decided that *Lao, Holdridge & Gentry 5* either belongs to the genus *Schistostemon*, known from the Guianas and parts of the Amazon Basin, or is to be referred to *Sacoglottis mattogrossensis* Malme, found in Colombia, Venezuela, the Guianas, and Brazil. The genus *Sacoglottis* has been reported from Panama by Johnston (1949; 161) as occurring in the drift on the beaches of San José Island, Province of Panamá, and by Holdridge (1970; 260). Holdridge in his manual does not designate the species of *Sacoglottis* which occurs in Panama, however. At the same time he indicates that *Sacoglottis* occurs in

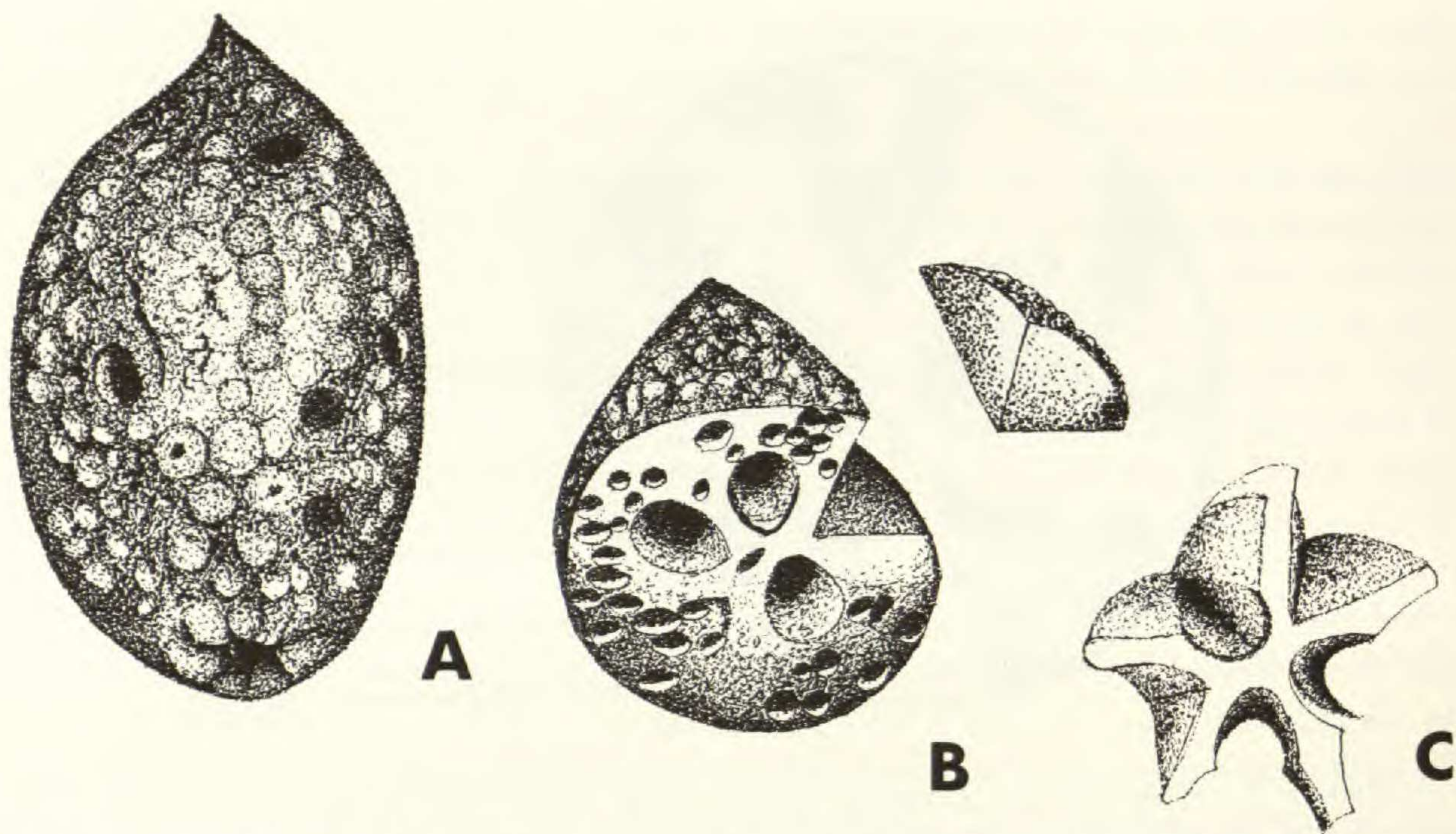


FIGURE 2. Fruit of *Sacoglottis* sp. (or *Schistostemon* sp.), endocarp only shown natural size.—A. External view, the resinous cysts visible as holes of varying diameter.—B. Endocarp shown in hemisection, one displaced valve shown to right; the seminal cavities are large, the resinous cysts smaller.—C. Lignified septa with all valves absent. Based on *Lao, Holdridge & Gentry 5* (MO). $\times 1\frac{2}{3}$.

Costa Rica. Dr. Holdridge says (personal communication) that *S. ovicarpa* Cuatr. is the forest dominant on Cocos Island, Costa Rica.

In conclusion, one speculates whether *Sacoglottis* and *Schistostemon* may not be congeneric. The floral differences separating the two genera do not appear to be strong, judging from Cuatrecasas' work. What is especially needed is intensive collection of the Humariaceae, particularly the fruits in various stages of development.

LACISTEMACEAE (Nevling—Part 4. Vol. 47: 124–127. 1960).

Lacistema aggregatum (Berg.) Rusby—*H* 6451 (19), 8 cm \times 6 m. A common tree in the Republic.

Lozania pedicellata (Standley) L. B. Smith—*H* 6484 (15), 6 m. There are only three collections of *L. pedicellata* from Panama, *von Wedel 2121* (MO) from Old Bank Island, Province of Bocas del Toro, *Ebinger 348* (MO) from Cerro Campana, Province of Panamá, and *Shattuck 972* from Barro Colorado Island, Canal Zone.

LAURACEAE (Allen—Part 5. Vol. 35: 1–68. 1948).

Nectandra fuscobarbata (Mez) Allen—*H* 6403 (15), 40 cm \times 15 m. Known previously from two widely separated localities in Panama: Isla Colón, Province of Bocas del Toro, and Pinas Bay, Province of Darién.

N. gentlei Lundell—*H* 6407 (6), 30 cm \times 10 m. Known in Panama from the lowlands of Chiriquí Province and from the Canal Zone.

N. globosa (Aubl.) Mez—*L & H* 52 (36), 20 cm \times 10 m, collected at 100 meters elevation; *H* 6447 (18), 35 cm \times 13 m. This species ranges from

Guatemala to Panama; it has been reported in Panama from the Province of Panamá and the Canal Zone.

N. martinicensis Mez—*H* 6508 (21), 22 cm × 10 m. Our material in the Missouri Botanical Garden is from Tobago, Trinidad, and Granada in the West Indies.

N. standleyi Allen—*L* 102 (2), 15 cm × 10 m, "Sigua Amarillo"; *L* 103 (2), "Sigua Blanco." This species is known from Bocas del Toro and possibly from the Province of Panamá, especially from Juan Diaz (*Allen* 942 (MO)).

Persea caerulea (R. & P.) Mez—*L* 46 (27), 30 cm × 15 m, collected at 350 m elevation. There is a single collection of this well-known species in the Missouri Botanical Garden, *Allen* 1015 from Boqueté, Province of Chiriquí.

Phoebe johnstonii Allen—*H* 6433B (45), 10 cm × 5 m; *H* 6518 (5), 20 cm × 8 m. This has been previously reported from San Jose Island, Province of Panamá (*Johnston* 697 (MO, the type collection)) and from the Province of Chiriquí (*Stern et al.* 1143 (MO)).

P. mexicana Meisn.—*H.* 6475 (40), 8 m. This species is well distributed in Mexico and Central America. This is probably the first report of the species in Panama, although Dr. Croat informs me that he has undistributed material of the species from Barro Colorado Island, Canal Zone.

LECYTHIDACEAE (Woodson—Part 7. Vol. 45: 115–136. 1958).

Grias fendleri Seem.—*L* & *H* 232 (21), 25 cm × 8 m. This species is known from the Provinces of Bocas del Toro, Canal Zone, and Colón. Dr. Croat reports its presence on Barro Colorado Island, Canal Zone.

Eschweilera calyculata Pittier—*L* & *H* 158 (20), 12 cm × 10 m. This is the first report of the species in the Province of Colón. It has been previously reported from the Provinces of Bocas del Toro and the Canal Zone.

E. pittieri R. Kunth—*L*, *H* & *G* 12 (7), 40 cm × 25 m, collected at 100 meters elevation; *L* & *H* 191 (21), 18 cm × 15 m, collected at 100 meters elevation, "Ollito." This species, heretofore reported only from the Provinces of Chiriquí and the Province of Darién, is common along the Pipe Line Road in the Canal Zone.

LEGUMINOSAE

Andira inermis (Sw.) H.B.K.—*H* 6496 (40), 20 cm × 8 m. Known from collections in Bocas del Toro, Canal Zone, Coclé, Darién, and Panamá.

Bauhinia monandra Kurz—*H* 6348 (42), 6 m. This is an ornamental species widely grown in tropical regions. It is native to India. Mr. R. Wunderlin, a specialist on *Bauhinia*, indicates (personal communication) that it occasionally escapes from cultivation in Panama and that it is becoming naturalized in parts of Central America and the West Indies.

Cassia siamea Lam.—*L* 86 (35), 22 cm × 5 m.

Copaifera panamensis (Britt.) Standley—*L* 44 (31), 50 cm × 5 m, "Cabimo"; *L* 43 (31), 30 cm × 10 m, "Cabimo." Rather common near streams in the lowlands of Veraguas and Coclé Provinces in Panama.

Coumarouna oleifera (Benth.) Taub.—*L* & *H* 177 (10), 60 cm × 25 m, collected at 150 meters elevation. Heretofore, this species was reported only from the Provinces of Darién and Panamá.

Cynometra bauhiniaefolia Benth.—*L* & *H* 17 (24), 70 cm × 20 m; *L* & *H* 168 (16), 50 cm × 15 m. This species, ranging from Guatemala to Chile, has been rarely collected in Panama.

Erythrina berteriana Urb.—*L* 112 (44), 15 cm × 5 m, "Pito."

Hymenaea courbaril L.—*H* 6434 (45), 50 cm × 12 m. This species is common in the dry lowlands of the Azuero Peninsula, Panama.

Inga edulis Willd.—*L* 59 (45), 15 cm × 8 m, "Guabo." A common tree.

I. thibaudiana DC.—*L* & *H* 187 (21), a small tree.

Lonchocarpus peninsularis (Smith) Pittier—*L* & *H* 253 (13), 10 cm × 6 m, "Gallito."

L. pentaphyllus (Poir.) DC. (*P. latifolius* H.B.K.)—*L* & *H* 242 (21), 25 cm × 25 m; *L* & *H* 153 (20), 6 cm × 6 m. This species is common in Central America, the West Indies, and northern South America.

Machaerium arboreum (Jacq.) Vogel—*L* & *H* 186 (21), 3 m. It ranges from Mexico to Panama. It is known from two collections in the Canal Zone.

Ormosia coccinea (Aubl.) Jacq.—*L* 114 (42). This will probably prove to be a new variety of *O. coccinea*. According to Dr. Croat it is common on Barro Colorado Island, Canal Zone.

Platymiscium polystachum Benth. ex Seem.—*L* 142 (32), 60 cm × 20 m, collected at 100 meters elevation, "Guyacan." It is known in Panama from the Provinces of Canal Zone, Coclé, Darién, Los Santos, and Panamá.

Pithecellobium dulce (Roxb.) Benth.—*L* 60 (42), 45 cm × 10 m.

P. latifolium (L.) Benth.—* *L* & *H* 238 (21) 5 m.

P. rufescens Benth.—* *H* 6391 (10), collected at 100 meters elevation; * *H* 6404 (15), 30 cm × 10 m. This species, restricted to Panama, is common throughout the Republic.

Swartzia panamensis Benth.—*H* 6450 (19), 25 cm × 10 m.

MALPIGHIACEAE

Brysonima spicata (Cav.) H.B.K.—*L* & *H* 251 (21), 12 m, "Nancillo." The species has heretofore been known only from Barro Colorado Island, Canal Zone. Dr. Croat reports that it reaches a height of 20 meters on the Island.

MELASTOMACEAE (Gleason—Part 7. Vol. 45: 203–304. 1958).

Conostegia xalapensis (Bonpl.) Don—*H* 6442 (19), 6 m. This species is very common in Panama.

Leandra consimilis Gleason—*L* & *H* 220 (21), 6 cm × 5 m.

Miconia borealis Gleason—*L* & *H* 171 (11), 4 cm × 3 m; *H* 6420 (4), 5 m tall. This species is common in the lowlands.

M. lacera (Bonpl.) Naud.—*L* & *H* 184 (21), 5 cm × 4 m. Very common.

M. aff. macrophylla Tr.—*L* & *H* 215 (21), small tree.

M. pteropoda Benth.—*L* 78 (29), 5 cm × 5 m, collected at 400 meters elevation, "Canillo."

MELIACEAE (Smith—Part 6. Vol. 52: 55–79. 1965).

Carapa guianensis Aubl.—*L* & *H* 239 (21), 35 cm × 20 m. There are no collections of this species from Panama in the Herbarium of the Missouri Botanical Garden.

Cedrela fissilis Vell.—*L* 104 (45), 32 cm × 13 m, "Cedro Amargo." This

species has a wide range extending from Costa Rica through Panama, southward to Brazil.

Guarea glabra Vahl—*H* 6444 (19), 30 cm × 10 m. It is common throughout Panama.

Trichilia cipo (Juss.) C. DC.—* *H* 6501 (40), 20 cm × 14 m; *H* 6394 (10), 15 cm × 10 m; *L* & *H* 204 (21).

T. tomentosa H.B.K.—*L* & *H* 189 (21), collected at 100 meters elevation; *H* 6498 (40), 15 cm × 10 m; * *H* 6499 (10), a small tree, collected at 100 meters elevation. This species has been previously reported in the Provinces of Bocas del Toro, Chiriquí, Darién, and Panamá.

MONINIACEAE (Duke—Part 4. Vol. 49: 537–551. 1963).

Siparuna guianensis Aubl.—*L* & *H* 180 (21), 4 m. This species is widely distributed in Panama, with most collections at lower elevations but a few extending to 800 meters elevation.

S. pauciflora (Beurl.) DC.—*L* & *H* 208 (21), "Pasmao." This species is widely distributed in Panama.

MORACEAE (Woodson *et al.*—Part 4. Vol. 47: 114–165. 1960).

Brosimum guianense (Aubl.) Huber—*H* & *M* 6533 (5). This is presumably the second collection of this species in the Republic; the one collection was that of Pittier (4336) from Puerto Obaldía, Province of San Blas.

Cecropia eximia Cuatr.—*L* & *H* 211 (21), 20 cm × 10 m, "Guarumo Blanco." Dr. Holdridge says that this is conspecific with *Cecropia insignis* Liebm. The species has been collected on the Atlantic side of the Canal Zone by Johnston (1758) and is reported to attain a height of 125 feet on Barro Colorado Island, Canal Zone (*vide* Dr. Croat).

C. longipes Pittier—*L* 120 (21), 10 cm × 8 m, "Guarumo." This collection is noteworthy for having well-developed male inflorescences. Three recent collections are noteworthy: *Croat* 10115 (MO) from Barro Colorado Island, Canal Zone; *Blum* 2241 (MO) from Albrook, Canal Zone; *Lazor* & *Correa* 3440 (MO) from the Airport at El Real, Province of Darién. The species is probably more widely distributed in the Republic than collections suggest.

C. maxonii Pittier—*L* & *H* 181 (21), 12 cm × 8 m, "Guarumo Peludo." There is a single collection of this species in the Herbarium of the Missouri Botanical Garden: *Davidson* 862 (MO) from Boqueté, Province of Chiriquí.

C. obtusifolia Bertol.—*L* & *H* 169 (21). This is the first report of this species in the Province of Colón, although it is known from the Provinces of Bocas del Toro, Canal Zone, Darién, and Veraguas.

C. peltata L.—*L* & *H* 203 (21). This is very common in Panama.

Coussapoa panamensis Pittier—*L* & *H* 21 (24), 20 cm × 20 m. This species, extending from Guatemala to Panama, is known in Panama from the Provinces of Bocas del Toro, Canal Zone, Colón, and Panamá.

Ficus colubrinae Standley—*H* 6441 (19), 25 cm × 7 m.

F. perforata L.—*L* & *H* 235 (21), 10 cm × 8 m. This is described on the herbarium label as an epiphyte.

F. radula Willd.—*H* 6461 (41). The only sheet which I have seen labelled *F.*

radula is Standley 26722 (MO). In his treatment of *Ficus* in the *Flora of Panama* (p. 189), DeWolf regards this species as a synonym of the well collected *F. maxima* Mill., extending from Mexico to the Amazon Basin.

Perebea xanthochyma Karst.—H 6483 (15), 15 cm × 8 m. This species is known from the Provinces of the Canal Zone and Bocas del Toro; its overall range is from Costa Rica to Colombia. Johnston (1692 (MO)) notes are helpful: "Understory tree, 10–30 ft. tall, in shady forest, no latex but a honey-like resinous sap that turns brown after exposure to air . . ."

MYRTACEAE (Amshoff—Part 7. Vol. 45: 165–201. 1958).

Eugenia aff. *salamancana* Standley—L & H 237 (21), 25 cm × 10 m; L & H 194 (21), 25 cm × 20 m, collected at 100 meters elevation. This species is known only from the type collection, Woodson, Allen & Seibert 1570 (MO), collected at the Salamanca Hydrographic Station in the Canal Zone, adjacent to the site of the present collection. The type, described as having white flowers, is flowerless. While the type collection and the Lao and Holdridge collections agree in having coriaceous leaves, they differ in that the latter collection has glabrous twiglets. The fruits, heretofore undescribed for *E. salamancana*, are axillary, sessile, conglomerate, with each fruit measuring to 1½ cm in length; the sepals are 4, persistent, erect, and ⅓–½ the length of the body of the fruit.

E. zeketiana Standley—L & H 214 (21), 3 cm × 3 m. This species was first described by Paul Standley in 1925 from two collections in the Canal Zone: Standley 27503 (US, type collection) and 27192 (US). While the inflorescence is described in detail, the flowers are referred to merely as "sessile." It is true that the calycine lobes, as found in the fruit, are described in detail. Johnston collected the plant (1606 (MO)) on "the road to Battery VII" in the Canal Zone, noting its abundance in the "high shady forests." He has illuminating notes on the herbarium sheet: "Stamens white or cream; petals rose on outer face; fruit globose, 20 mm diam., one-seeded, seed with fleshy watery coat; fruiting calyx inflexed, persistent." The recent collection of *E. zeketiana* by Duke & Elias (13761 (MO)) from Cerro Pirre, Province of Darién, Panama, extends the range almost to the Colombian border. The vernacular name is "Gasparillo."

Myrcia aff. *costaricensis* Berg.—L 138 (20), 12 cm × 6 m, collected at 350 meters elevation. The fruits are described as edible.

M. costaricensis Berg.—L & H 155 (20), 15 cm × 11 m. This species is known from Costa Rica to Panama.

M. fallax (Rich.) DC.—L & H 223 (21), 15 cm × 6 m. This species is not listed in the relatively recent treatment of the family in the *Flora of Panama*.

M. splendens (Sw.) DC.—L 144 (28), 5 cm × 3–4 m, collected at 350 meters elevation. It extends from southern Mexico to South America; it also occurs in the West Indies. To my knowledge this is the first report for Panama.

Psidium sp.—H 6459 (40), 6 cm × 7 m. This tree is probably a new species. The leaves, borne on wiry branchlets, have petioles to 5 mm long and stiffly chartaceous glabrous blades which measure to 10.5 cm long and 4 cm wide; the acumen of the blade measures to 1.5 cm long; the calycine lobes spread

radiately with each lobe to 1 cm long and obtuse to deltoid at the apex; the petals, described on the label as red or white, measure to 2 cm in length.

MYRISTICACEAE (Duke—Part 4. Vol. 49: 214–225. 1963).

Dialyanthera parvifolia Markg.—* *L & H* 209 (21), collected at 100 meters elevation. This species is not listed in the relatively recent treatment of the family Myristicaceae in the *Flora of Panama*.

Virola koschyni Warb.—* *L & H* 205 (21), “Miguelario.” This species, ranging from Guatemala to Panama, has been reported previously as collected in the Provinces of Chiriquí and Darién in Panama.

V. surinamensis (Rol.) Ward.—*L & M* 201 (21), 6 m, “Velario.” This species has not been reported from Panama, although it occurs in the Lesser Antilles, the Guianas, and in parts of Brazil.

MYRSINACEAE (Lundell—Part 8. Vol. 58: 285–353. 1971).

Rapanea pellucido-punctata (Oerst.) Mez—*L* 74 (29), 10 cm × 6 m, “Manglillo.”

NYCTAGINACEAE (Woodson—Part 4. Vol. 48: 393–407. 1961).

Guapira costaricana (Standley) Woodson—*H* 6413 (6), 5 m. Very common in Panama.

OLACACEAE (Nevling—Part 4. Vol. 47: 293–302. 1961).

Heisteria concinna Standley—*H* 6468 (41), 10 cm × 8 m. This species is known from five provinces of Panama: Canal Zone, Darién, Herrera, Los Santos, and Veraguas.

H. longipes Standley—*L* 165 (18), 8 cm × 8 m, “Sierrito.” This is common throughout Panama.

Ximenia americana L.—*H* 6481 (14), 20 cm × 7 m. This coastal species is widely distributed in Panama.

PALMAE (Bailey—Part 2. Vol. 30: 231–396. 1943).

Attalea allenii H. E. Moore—*L & H* 197 (21). “Palm without trunk, racemes of fruits apparently rising from the ground” is recorded on the collection. The common name is “Bangué.” The type collection is *Allen 4103* (MO).

PIPERACEAE (Yuncker—Part 4. Vol. 37: 1–120. 1960).

Piper aduncum L.—*L & H* 219 (21), 4 m; *L & H* 200 (21), 4 m, “Pasmo.”

P. arboreum Aubl.—*L* 22 (24), shrub or small tree. This collection was made at 600 meters elevation. Although this species is poorly represented in the herbarium of the Missouri Botanical Garden, it has been widely collected in the Republic, particularly at elevations between 300 and 800 meters.

P. reticulatum L.—*H* 6443 (19), 10 cm × 6 m. This is a common species in Panama.

POLYGONACEAE (Howard (*Coccoloba* only)—Part 4. Vol. 47: 340–353. 1961).

Coccoloba caracasana Meissn.—*H* 6379 (45), 13 m tall; *H* 6453 (40), 20 cm × 8 m. This is common throughout the Republic.

RHIZOPHORACEAE

Cassipourea elliptica (Sw.) Poir.—*L* 167 (18), 15 cm × 8 m; *L & H* 196 (21), 8 cm × 9 m. This species is widely distributed in Central America and the West Indies.

ROSACEAE (McVaugh—Part 5. Vol. 37: 147–178. 1950).

Hirtella americana L.—L 68 (38), 45 cm × 15 m, collected at 110 meters elevation. It extends through most of Middle America to northern South America.

H. latifolia Prance—H & M 6526 (13), 20 cm × 8 m, collected at 100 meters elevation. This matches well the type collection, *Duke 8012* (MO), from Cerro Jefe, Province of Panamá.

H. triandra Sw.—H 6392 (10), 20 cm × 12 m, collected at 100 meters elevation.

Licania platypus (Hemsley) Frit.—H 6457 (40), 30 cm × 12 m. This species occurs throughout Middle America, extending to Colombia. It also occurs in the West Indies.

RUBIACEAE

Alibertia edulis (Rich.) Rich.—L & M 224 (21), 3 m. This species is common throughout tropical America.

Amaioua corymbosa Benth.—L & M 225 (21), 12 cm × 6 m. This species is found sporadically in some countries of Middle America, extending to the Guianas and Brazil. It also occurs in Trinidad and Cuba. In Panama it is common in the woods at Cerro Azul, Province of Panamá, at about 650 meters elevation.

Chomelia spinosa Jacq.—H 6536 (5), 20 cm × 10 m.

Coutarea hexandra (Jacq.) Schum.—H 6534B (5). This species is sporadic in Panama. I have collected it several times at Farfan Beach, Canal Zone.

Guettarda odorata (Jacq.) Lam.—L 139 (28), 4 cm × 8 m, collected at 350 meters elevation.

Isertia hypoleuca Benth.—L 127 (4), 15 cm × 8 m; L, H & G 10 (23), 25–30 cm × 8 m. This species is readily collected on the Atlantic side of the Isthmus at Mariá Chiquita, Province of Colón.

Machaonia acuminata HBK.—L 146 (26), shrub or small tree. This was collected, the herbarium label tells us, between wet and dry woods at 130 meters elevation. This species is readily accessible at the military airstrip, in the adjacent thickets, at Río Hato, Province of Coclé, Panama.

Macronemum glabrescens Benth.—L 233 (21), 20 cm × 10 m.

Morinda citrifolia L.—H 6507 (21), 20 cm × 10 m. This species has been frequently collected in the Province of Colón, Panama.

Pentagonia macrophylla Benth.—L 93 (1), 20 cm × 18 m, "Indian Ink." I suspect that Lao may be in error when he notes that this tree reaches almost 60 feet in height.

Psychotria umbelliformis Dwyer & Hayden—L 164 (18), 10 cm × 10 m, "Palo de Agua," collected at 200 meters elevation. There are at least three collections of this species: *Duke 12154* (MO) from Cerro Pilon, Province of Coclé; *Duke 15219* (MO, the type collection), from Cerro Jefe, Province of Panamá; *Kirkbride & Duke 1641* (MO) from Cerro Trinidad, Province of Panamá.

Randia aculeata L.—L & H 248 (21), 3 m.

Tocoyena pittieri (Standley) Standley—H 6514 (43), 30 cm × 10 m. This

species was known previously in Panama from Barro Colorado Island, Canal Zone, and from Darién Province. For a discussion of the genus *Tocoyena* see Dwyer (1968).

RUTACEAE

Zanthoxylum setulosum P. Wilson—*L* 137 (28), 10 cm × 5 m. This species is common throughout Panama.

SAPINDACEAE

Cupania costaricensis Radkl.—*L* & *H* 162 (20), 20 cm × 10 m.

C. papillosa (= *C. latifolia*)—*H* 6388 (10), 40 cm × 8 m.

C. scrobiculata L.—*H* 6416 (4), 3 m tall.

SAPOTACEAE (Blackwell—Part 8. Vol. 55: 145–169. 1968).

Pouteria campechiana (HBK) Baehni—*H* 6497 (40), 10 cm × 10 m. This species ranges from southern Mexico to Panama. It also occurs in Cuba and the Florida Keys. In Panama it has been reported in the Canal Zone and in the Provinces of Coclé, Colón, and Panamá.

P. durlandii (Standley) Baehni—*L* & *H* 192 (21), 20 cm × 10 m. This species ranges from Mexico to Costa Rica, and now has its range extended into Panama.

P. engleri Eyma—* *H* 6524 (13), 50 cm × 20 m.

P. neglecta Cronquist—*L* & *H* 198 (21), 6 m; *H* 199 (21), 25 cm × 20 m. This species, now reported for the first time in Panama, ranges from Guatemala to Panama. Dr. Croat recently collected this tall tree at the Río Frijoles in the Canal Zone (*Croat 16619* (MO)).

P. sapota (Jacq.) Moore & Stearn—*L* 108 (44), 29 cm × 17 m, "Mamey." This species is widely distributed in the tropics.

P. stylosa (Pierre) Dubard—* *H* 6466 (41), 25 cm × 8 m. This species is known from the Provinces of Bocas del Toro, Canal Zone, and Panamá.

STAPHYLEACEAE

Turpinia paniculata Vent.—*L* & *H* 14 (7), small tree.

URTICACEAE (Killip—Part 4. Vol. 47: 179–198. 1960).

Myriocarpa yzabalensis (Donn. Sm.) Killip—*H* 6449 (19), 5 m. This species is common throughout the Republic.

VERBENACEAE

Cornutia grandifolia (Schl. & Cham.) Schauer—*H* 6454 (40), 5 m.

Lippia urticoides Steud.—*L* 175 (33), 3 m.

VIOLACEAE (Robyns—Part 6. Vol. 54: 65–84. 1967).

Rinorea brachytrix Blake—*H* 6472 (41), 4 m. This is the second collection of this species in Panama. The type, *Pittier 6601* (US), is from the vicinity of La Palma, Province of Darién, Panama.

LITERATURE CITED

- CUATRECASAS, J. 1961. A Revision of the Humariaceae. *Contr. U.S. Natl. Herb.* 35: 25–214.
 DWYER, J. D. 1964. Panama, Plant Collection and the Missouri Botanical Garden. *Ann. Missouri Bot. Gard.* 51: 108–117.
 ———. 1968. *Borojoa* and *Tocoyena* (Rubiaceae) in Panama. *Phytologia* 18: 445–449.
 HOLDRIDGE, L. R. 1970. *Inventariación y Demonstraciones Forestales Panama* (Manual Dendrológico Para 1000 Especies Arbóreas en la República de Panama (Programa de Las Naciones Unidas)). Panamá.
 JOHNSTON, I. 1949. The Botany of San Jose Island (Gulf of Panama). *Sargentia* 8: 1–306.